Also, once having gotten a foothold in a given area, they could easily have been carried from lake to lake over the short intervening distances in the fur and clinging to the feet of various mammals, especially beaver, bear, mink, otter and others which regularly or occasionally take to the water or wade in the edges of the lakes. As so many of the lakes have no connection with streams except by slow seepage through their moraines, and contain no fishes, it is evident that the mollusks could not have been introduced by clinging to fishes. Furthermore, the fish route would not account for the numerous colonies of land snails, while the bird and mammal route would.

Instances of very recent introduction of aquatic mollusks into small ponds are known in the Rocky Mountain region. On a high divide in Wyoming I found a small pool recently made by throwing an earth dam across a small, dry run, to catch the storm water for cattle. It was already inhabited by *Lymnaea bulimoides cockerelli*, which could only have been brought in by birds or some other such agency. In the shifting sandhills of eastern Colorado we have found *Lymnaea* and *Physa* in several ponds entirely surrounded by great sand hills. As the sand shifts rapidly and constantly, they could not have been there many years, certainly not centuries and could not have been brought in along drainage lines. Numerous other such cases are known. The most plausible method of their introduction I have been able to think of in the years spent in observing these facts is by clinging to the feathers of birds and hair of mammals, and this method seems consistent with all the facts and inconsistent with none.

NOTES ON THE DONAX OF CALIFORNIA

BY A. M. STRONG

The first description of a Donax from California was that of *Donax californicus* Conrad, 1837. This was followed by Dr. Gould's *D. obesa* 1851, collected by Lieut. Green at San Diego, and *D. flexuosus* 1857, from Col. Jewett's Santa Barbara collec-

tion. A number of species from Mazatlan, Acapulco and Panama were also described by the early writers.

Carpenter in the British Association Report, 1856, p. 229, lists from Col. Jewett's Santa Barbara collection the following species; *D. rostratus* C. B. Adams,=*culminatus* B. M. Cat., No. 37 ; *D. californicus* Conrad ; *D. gracilis* Hanley ; and *D. flexuosus* Gould. From Lieut. Green's collection from San Diego he lists, p. 232, *D. californicus* Conrad,=*D. laevigata* Deshayes; *D. abruptus* Gould,=*D. californicus* Conrad, var. ; and *D. californicus* Conrad, var. In another place he lists from California, p. 287, *D. conradii* Deshayes,+*D. californicus* Desh. ms. *non* Conr. In his final table he only lists from Upper California the following ; *D. flexuosus*, *D. californicus*, *D. rostratus* and *D. gracilis.*

During Dr. Carpenter's visit to the United States he examined in detail the specimens collected by Col. Jewett and Lieut. Green and in his Supplementary Report, 1863, p. 536, he only lists from Santa Barbara *D. californicus* and *D. flexuosus*; *D. rostratus* being listed from Acapulco and *D. gracilis* from Panama. He states the *D. abruptus* from San Diego should be *D. obesus* Gould, and adds from the collection of Major Rich *D. californicus* from Monterey. In the final table in the Report, p. 640 he reduces the California list to *D. californicus* Conr. (*non* Desh)= D. *obesus* Gould, (*non* Desh.) and *D. flexuosus* Gould. To these he adds *D. navicula* Sowerby, from the southern fauna.

In the Mazatlan Catalogue, 1857, Dr. Carpenter mentions some of the names used for the California shells as follows ; under No. 75, *D. punctatostriata* Hanley, he gives?=*flexuosus* Gould's plates, and under No. 76, *D. conradi* Desh., gives+*D. californicus* Conr. teste Desh., adding "The *D. californicus*, teste Nuttall, whose shells were the basis of Conrad's description, is very different from the shell so named by Deshayes in the Br. Mus. and Col. Cuming."

In 1900 Dr. Dall in the Transactions of the Wagner Free Institute of Science, vol, 3, part 5, p. 968, points out that the shell identified as *D. navicula* by Carpenter is the true *D. californica* of Conrad and he applies the name *D. laevigata* Desh. to the shell considered to be *D. californicus* by Carpenter=*obesa* Gould. Finally in 1919, finding that *laevigata* Desh., could not

be used, Dr. Dall suggests the new name *D. gouldii* Dall for this species. In the same connection he states that the specimens on which Dr. Gould based his description of *D. flexuosus* are identical with the West Indian *D. striata* Linne, and are undoubtedly a case of mixed locality labels.

This reduces the recognized species of Donax from California to two, variously given as follows :

Donax californica Conrad, 1837. Journ. Acad. Nat. Sci., Phila., vol. 7, p. 254. Bull. U. S. Nat. Mus. No. 112, p. 49.

D. navicula Sby., Cpr. Brit. Ass'n. Rep't. 1863, p. 640.

D. flexuosus Gld., Cooper, 7th Ann. Rep't Cal. St. Min., p. 238.

D. flexuosus Gld., Williamson, Proc. U. S. Nat. Mus., vol. 15, p. 186.

D. flexuosus Gld. Keep, West Coast Shells, ed. 1892, p. 192.

D. californicus Conr., Dall, Trans. Wagner Inst. Vol. 3, p. 968.

D. californicus Conr., Arnold, Pal. San Pedro, p. 170.

D. californicus Conr., Keep, West Coast Shells, ed. 1911, p. 88.

D. californicus Conr., Fish Bull. No. 4, Cal. Fish and Game Com. p. 47.

Donax gouldii Dall, 1919. Bull. U. S. Nat. Mus., No. 112, p. 49. Boston Journ. Nat. Hist., vol. 6, p. 394 as D. obesus, Gould.

D. californicus Conr., Cpr. Brit. Ass'n Rep't 1863, p. 640.

D. californicus Conr., Cooper, 7th. Ann. Rep't Cal. St. Min. p. 238.

D. californicus Conr., Williamson, Proc. U. S. Nat. Mus., vol. 15, p. 186.

D. californicus Conr., Keep, West Coast Shells, ed. 1892, p. 192.

D. laevigata Desh., Dall. Trans. Wagner Inst., vol. 3, p. 969.

D. laevigata Desh., Arnold, Pal. San Pedro, p. 170.

D. laevigata Desh., Keep, West Coast Shells, ed. 1911, p. 87.

D. laevigata Desh., Fish Bull. No. 4, Cal. Fish and Game Com., p. 47.

Donax punctatostriata Hanley, and *Donax conradi* Desh., both common in the Gulf of California fauna, have been reported from California in published lists. I am unable to find any record to support this among the California collectors. It seems probable that the records were either based on old identifications following Carpenter's statements of the synonymy, *D. conradi* equaling *D. californicus* as used by Deshayes and *D. punctatostriata* equaling *D. flexuosus* Gould, or on valves off boats coming up from the lower coast, as has proven to be the case in several instances. Unless an authentic record of living specimens from California points can be found, both species should be stricken from the California lists. Both Carpenter's record of *Donax gouldii* Dall from Monterey and Dall's from San Louis Obispo County need further verification. It does not seem probable that the species will be found living north of Point Conception.

AMPHIDROMUS VIRESCENS (SWAINSON)

BY BRYANT WALKER

This species was originally described by Swainson as "*Bulimus virescens*" (*Bulimus citrinus* var.?) in the Appendix to the "Catalogue of the Rare and Valuable Shells which formed the celebrated collection of the late Mrs. Bligh," 1822, App. p. 13. The description is as follows:—"Shell obovate, green, variegated with yellow; spire conic, slightly thickened, obtuse; the volutions depressed on the suture and generally reversed; inner lip obsolete; umbilicus open". He further states:—"The same uncertainty exists with regard to this shell, as the last, viz. whether it should be considered as a variety, or as a distinct species, from *B. citrinus* (Zool. Ill., pl. 42). I have seen many specimens, but not one where the inner lip was developed on the upper part, that is, between the umbilicus and the top of the outer lip. If this character be found constant, it should, I conceive, be taken as a good and sound *specific* distinction;